2009 AMC 8

Time limit: 40 minutes

Typeset by: LIVE by Po-Shen Loh
https://live.poshenloh.com/past-contests/amc8/2009

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1. Bridget bought a bag of apples at the grocery store. She gave half of the apples to Ann. Then she gave Cassie 3 apples, keeping 4 apples for herself. How many apples did Bridget buy?

A 3

B 4

C 7

D 11

E 14

2. On average, for every 4 sports cars sold at the local dealership, 7 sedans are sold. The dealership predicts that it will sell 28 sports cars next month. How many sedans does it expect to sell?

A 7

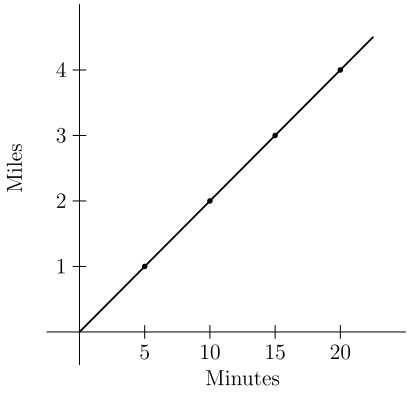
B 32

C 35

D 49

E 112

3. The graph shows the constant rate at which Suzanna rides her bike. If she rides a total of half an hour at the same speed, how many miles will she have ridden?



A 5

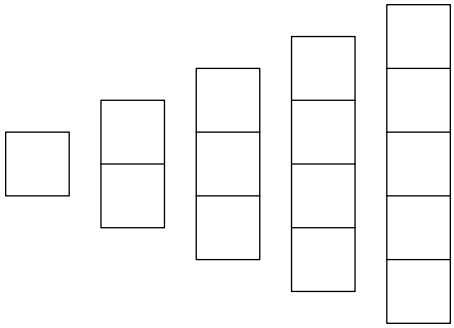
B 5.5

C 6

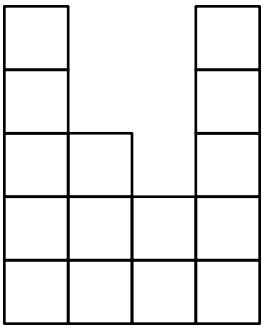
D 6.5

E 7

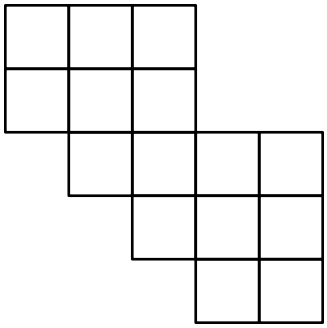
4. The five pieces shown below can be arranged to form four of the five figures below. Which figure **cannot** be formed?



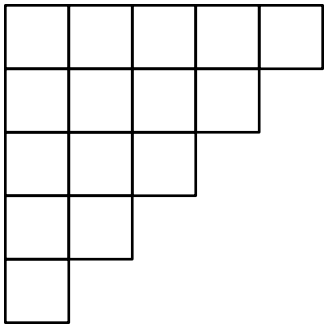
A



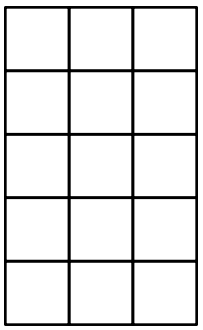
B



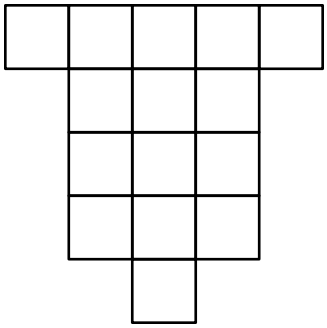
C



D



E



5. A sequence of numbers starts with 1, 2, and 3. The fourth number of the sequence is the sum of the previous three numbers in the sequence: $1 + 2 + 3 = 6$. In the same way, every number after the fourth is the sum of the previous three numbers. What is the eighth number in the sequence?

A 11

B 20

C 37

D 68

E 99

6. Steve's empty swimming pool will hold $24{,}000$ gallons of water when full. It will be filled by 4 hoses, each of which supplies 2.5 gallons of water per minute. How many hours will it take to fill Steve's pool?

A 40

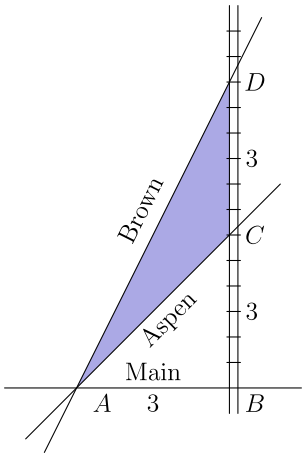
B 42

C 44

D 46

E 48

7. The triangular plot of ACD lies between Aspen Road, Brown Road and a railroad. Main Street runs east and west, and the railroad runs north and south. The numbers in the diagram indicate distances in miles. The width of the railroad track can be ignored. How many square miles are in the plot of land ACD?



A 2

B 3

C 4.5

D 6

E 9

8. The length of a rectangle is increased by 10% and the width is decreased by 10%. What percent of the old area is the new area?

A 90

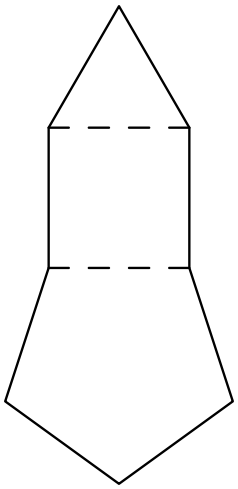
B 99

C 100

D 101

E 110

9. Construct a square on one side of an equilateral triangle. On one non-adjacent side of the square, construct a regular pentagon, as shown. On a non-adjacent side of the pentagon, construct a hexagon. Continue to construct regular polygons in the same way, until you construct an octagon. How many sides does the resulting polygon have?



A 21

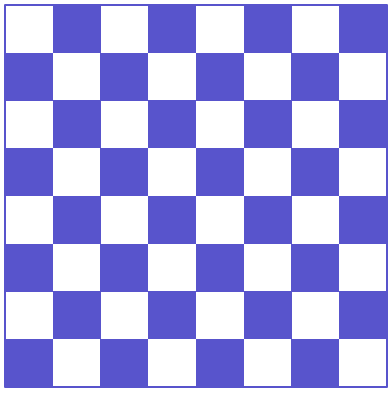
B 23

C 25

D 27

E 29

10. On a checkerboard composed of 64 unit squares, what is the probability that a randomly chosen unit square does **not** touch the outer edge of the board?



A $\frac{1}{16}$

B $\frac{7}{16}$

C $\frac{1}{2}$

D $\frac{9}{16}$

E $\frac{49}{64}$

11. The Amaco Middle School bookstore sells pencils costing a whole number of cents. Some seventh graders each bought a pencil, paying a total of 1.43 dollars. Some of the 30 sixth graders each bought a pencil, and they paid a total of 1.95 dollars. How many more sixth graders than seventh graders bought a pencil?

A 1

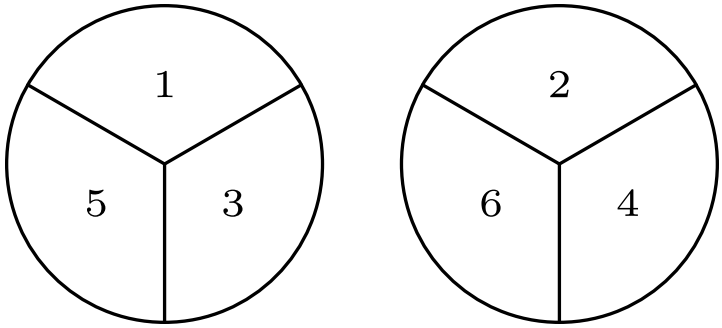
B 2

C 3

D 4

E 5

12. The two spinners shown are spun once and each lands on one of the numbered sectors. What is the probability that the sum of the numbers in the two sectors is prime?



A $\frac{1}{2}$

B $\frac{2}{3}$

C $\frac{3}{4}$

D $\frac{7}{9}$

E $\frac{5}{6}$

13. A three-digit integer contains one of each of the digits $1, 3,$ and $5.$ What is the probability that the integer is divisible by 5?

A $\frac{1}{6}$

B $\frac{1}{3}$

C $\frac{1}{2}$

D $\frac{2}{3}$

E $\frac{5}{6}$

14. Austin and Temple are 50 miles apart along Interstate $35.$ Bonnie drove from Austin to her daughter's house in Temple, averaging 60 miles per hour. Leaving the car with her daughter, Bonnie rode a bus back to Austin along the same route and averaged 40 miles per hour on the return trip. What was the average speed for the round trip, in miles per hour?

A 46

B 48

C 50

D 52

E 54

15. A recipe that makes 5 servings of hot chocolate requires 2 squares of chocolate, $\frac{1}{4}$ cup sugar, 1 cup water and 4 cups milk. Jordan has 5 squares of chocolate, 2 cups of sugar, lots of water, and 7 cups of milk. If she maintains the same ratio of ingredients, what is the greatest number of servings of hot chocolate she can make?

A $5\frac{1}{8}$

B $6\frac{1}{4}$

C $7\frac{1}{2}$

D $8\frac{3}{4}$

E $9\frac{7}{8}$

16. How many 3-digit positive integers have digits whose product equals 24?

A 12

B 15

C 18

D 21

E 24

17. The positive integers x and y are the two smallest positive integers for which the product of 360 and x is a square and the product of 360 and y is a cube. What is the sum of x and y?

A 80

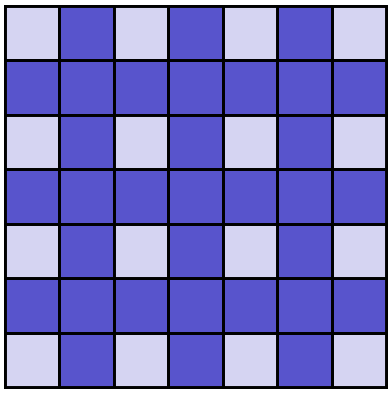
B 85

C 115

D 165

E 610

18. The diagram represents a 7-foot-by-7-foot floor that is tiled with 1-square-foot shaded tiles and unshaded tiles. Notice that the corners have unshaded tiles. If a 15-foot-by-15-foot floor is to be tiled in the same manner, how many unshaded tiles will be needed?



A 49

B 57

C 64

D 96

E 126

19. Two angles of an isosceles triangle measure 70° and x°. What is the sum of the three possible values of x?

A 95

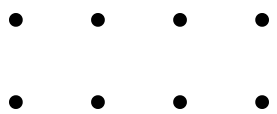
B 125

C 140

D 165

E 180

20. How many non-congruent triangles have vertices at three of the eight points in the array shown below?



A 5

B 6

C 7

D 8

E 9

21. Andy and Bethany have a rectangular array of numbers with 40 rows and 75 columns. Andy adds the numbers in each row. The average of his 40 sums is A. Bethany adds the numbers in each column. The average of her 75 sums is B. What is the value of $\frac{A}{B}$?

A $\frac{64}{225}$

B $\frac{8}{15}$

C 1

D $\frac{15}{8}$

E $\frac{225}{64}$

22. How many whole numbers between 1 and 1000 do **not** contain the digit 1?

A 512

B 648

C 720

D 728

E 800

23. On the last day of school, Mrs. Wonderful gave jelly beans to her class. She gave each boy as many jelly beans as there were boys in the class. She gave each girl as many jelly beans as there were girls in the class. She brought 400 jelly beans, and when she finished, she had six jelly beans left. There were two more boys than girls in her class. How many students were in her class?

A 26

B 28

C 30

D 32

E 34

24. The letters A, B, C and D all represent different digits. If $\begin{array}{cc} A & B \\ + \ C & A \\ \hline D & A \end{array}$ and $\begin{array}{cc} A & B \\ - \ C & A \\ \hline & A \end{array}$, what digit does D represent?

A 5

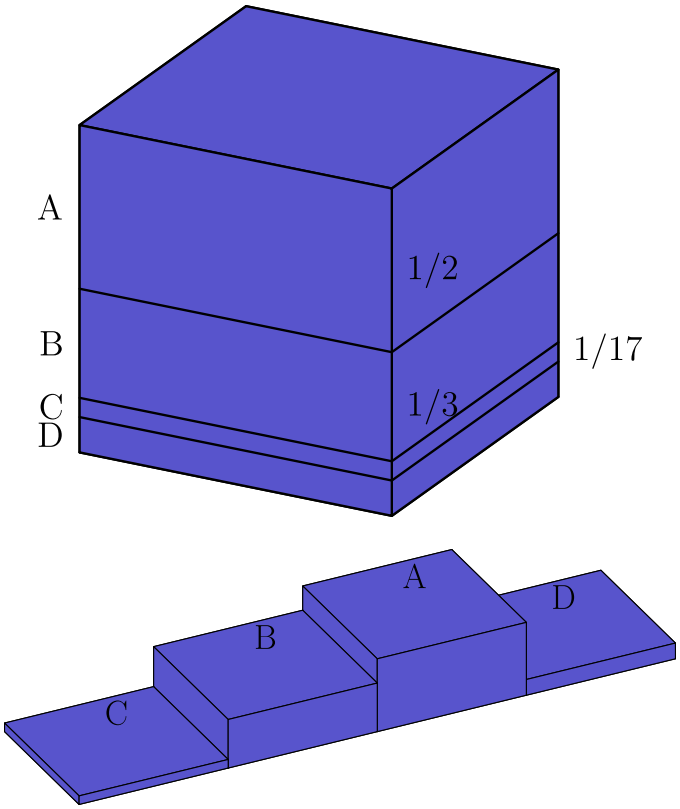
B 6

C 7

D 8

E 9

25. A one-cubic-foot cube is cut into four pieces by three cuts parallel to the top face of the cube. The first cut is $\frac{1}{2}$ foot from the top face. The second cut is $\frac{1}{3}$ foot below the first cut, and the third cut is $\frac{1}{17}$ foot below the second cut. From the top to the bottom the pieces are labeled A, B, C, and D. The pieces are then glued together end to end in the order C, B, A, D to make a long solid as shown. What is the total surface area of this solid in square feet?



A 6

B 7

C $\frac{419}{51}$

D $\frac{158}{17}$

E 11

Solutions: https://live.poshenloh.com/past-contests/amc8/2009/solutions

